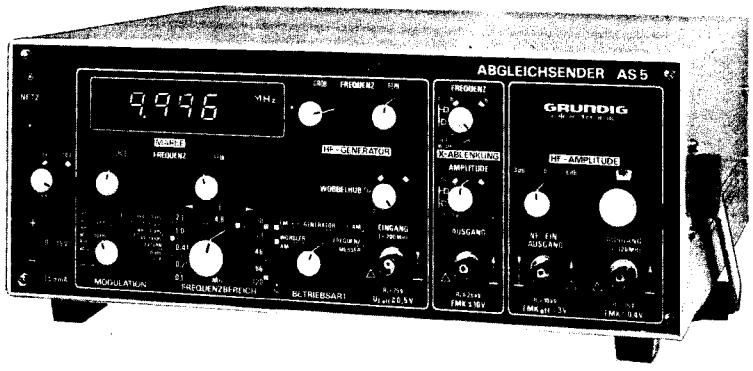
ABGLEICHSENDER AS 5/AS 5 F

BEDIENUNGS-ANLEITUNG

OPERATING INSTRUCTION



MC-Service

GRUNDIG electronic

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ABGLEICHSENDER
AS 5/AS 5 F

Gebrauchsanleitung

Direction for use

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6.5 Einsatz als Frequenzmesser

Der digitale Frequenzmesser mit Quarzzeitbasis, der zunächst zur Messung der HF-Generatorfrequenz und der Markenfrequenz vorgesehen ist, kann auch als separater Frequenzmesser für externe Signale von 50 kHz...200 MHz eingesetzt werden. Die zu messende Frequenz ist dazu mit einem Pegel von min. 0,5 U_{eff} von min. 0,5 V max. 5 V an Buchse (11) zu legen. Der Gleichspannungspegel darf 50 V= nicht überschreiten. Für den Betrieb als Frequenzmesser sind folgende Einstellungen vorzunehmen:

Drehschalter (9) "Betriebsart" in Stellung "Frequenzmesser" bringen (rechter Anschlag)

Zug/Druckschalter (18) drücken (Frequenzmesser eingeschaltet)

Nun wird die Frequenz des an Buchse (11) liegenden Signales stellenrichtig mit Dimensionsangabe angezeigt.

Die Meßfolge ist mit Einsteller (18) im Bereich von 5...50 Messungen pro Sekunde einstellbar.

Erscheint in der linken Stelle des Anzeigefeldes (8) ein "F" (Fehler), so liegt die Frequenz außerhalb des Meßbereiches. Je nach aufleuchtender Lampe (6) ist dann Drehschalter (7) nach links oder rechts zu drehen, bis die richtige Anzeige erfolgt.

ACHTUNG! Wird die Mindesteingangsspannung U_{eff} von 500 mV unterschritten, so kann vor Aussetzen der Meßwertanzeige ein fehlerhafter Wert angezeigt werden.

6.6 Einsatz eines X/Y-Schreibers

In den Stellungen "FM-Generator" und "AM-Generator" des Drehschalters (9) liegt an Buchse (13) eine Gleichspannung. Diese Gleichspannung ermöglicht die Aufzeichnung von Frequenzabhängigkeiten auf einem X/Y-Schreiber. Die Generatorfrequenz wird dabei mit Einsteller (19) von Hand verändert.

1. Introduction

The AS 5 signal generator is a multi-purpose unit to carry out measurements on RF equipment. It is used in the laboratory, in the test line, for educational purposes and in the radio and TV service department.

Frequencies between 100 kHz and 120 MHz are generated in ten bands. Three of these bands may be wobbulated (option I has five bands which may be wobbulated).
Two ranges may be frequency modulated internally or externally (option I allows three ranges).

The integrated digital frequency counter replaces the conventional scale and permits a precise and rapid adjustment and read-off of the frequency required.
In addition, the quartz controlled counter may also be used to measure external frequencies up to 200 MHz.

The special form of generating a marker pip during wobbulator operation replaces the conventional form of marker generator mixing. The marker pip frequency is measured exactly and is displayed in a digital fashion. The marker pip frequency is variable over the full wobbulator range and is quartz stabilised.

The wobbulator frequency and that of the X-deflection may be set between 5 Hz and 50 Hz and it is therefore also suitable for use with steep-cut filters. The shape of the signal is either triangular or of sawtooth shape and may be selected as required.

A DC potential, referred to the frequency, is available to record the frequency response by means of an X/Y recorder during generator operation.

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2. Specification

2.1 General Applications

2.1.1 Climatic Conditions

Ambient temperature

Reference value:		23° C
Tolerance of reference value:		± 1 K
Nominal operating range:	I	+5...+40° C
Limit range:		+5...+40° C
Limit range for storage and transportation:		-10...+60° C for 3 days at +60° C 3 cycles of dry climatic conditions for 6 hours from -10°...+60° C

Relative Humidity

Reference range:		45...75 %
Nominal operating range:	I	20...80 %
Limit operating range:		10...90 %

Air Pressure

Reference value:		101.3 kN/m^2
Nominal operating range:	I	70...106.0 kN/m^2 (≦ 2200 m)

Heating Through Sunrays

Reference value:		No direct insulation
Nominal operating range:	I	No direct insulation

Speed of Movement of Ambient Air:

Reference range:		0...0.2 m/s
Operating range:	I	0...0.5 m/s

2.1.2 Mechanical Conditions

Operating Position

Reference value:		The front and side panels of the unit must be vertical.
Tolerence of reference value:		± 1°
Nominal operating range:	I	reference position ± 30°

Ventilation

Reference value:		Ventilation must not be obstructed.
Nominal range:	I	An insignificant amount of obstruction is permissible.
Drop Test		As per DIN 57 411, page 1
Vibration Test		As per DIN 57 411, page 1

2.1.3 Mains Supply

Mains Voltage

Reference value:		220 V
Tolerance of reference value:		± 1 %
Nominal operating range:	I	± 20 %
Power consumption:		≦ 75 W

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Mains Frequency

Reference value:		50 Hz
Tolerance of reference value:		± 1 %
Nominal operating range:		45...65 Hz
Distortion of reference value:	I	β = 0.05
Protection class	II	as per DIN 57 411, page 1

2.1.4 Mechanical Information

Case

Standard case:	G 51
Case colour:	Sky blue
Dimensions:	Width x Height x Depth 365 x 155 x 385 mm
Weight:	≦ 9 kg

Connecting Sockets

RF output:	BNC
Frequency meter input:	BNC
X-deflection:	BNC
Audio in/output:	BNC
Bias supply:	Telephone jacks, 4 mm Ø, 19 mm spacing

2.2 Electrical Values

2.2.1 RF Generators

Frequency ranges, generator operation- AM:

Range	Frequency Range Limit	Range Overlap
1	0.1 MHz	≧ - 3 %
2	0.21 MHz	≧ ± 3 %
3	0.41 MHz	≧ ± 3 %
4	1.0 MHz	≧ + 0 % - 6 %
5	2.1 MHz	
6	4.6 MHz	
7	10 MHz	≧ ± 3 %
8	21 MHz	
9	46 MHz	
10	86 MHz	
	120 MHz	≧ + 3 %

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Frequency ranges, wobbulator operation

Range	Frequency Range	Deviation 100 % Δ f
3′	0.395...0.535 MHz	140 kHz
7′	9.6 ...12.4 MHz	2.8 MHz
10′	83.0 ...125.0 MHz	42 MHz
	Additional at AS 5 F	
6′	4.45 ...7.25 MHz	2.8 MHz
8′	30.5 ...44.5 MHz	14 MHz

Frequency ranges, generator operation-FM

Range	Frequency Range	Nominal deviation at
7′	9.6 ...12.4 MHz	10.7 MHz
10′	83.0...125.0 MHz	98 MHz
	Additional at AS 5 F	
6′	4.45...7.25 MHz	5.5 MHz

Tolerance of frequency display: 1×10^{-4} ± 1 digit

Frequency stability: After a 15-minute warming-up period, typically ± 1×10^{-3}/10 minutes.

After 2.5 hours warming-up period, typically ± 1×10^{-4}/10 minutes.

Temperature coefficient of frequency: Typically ± 5×10^{-4}/K

Deviation: In the wobbulator ranges
at 100 % = 95 % Δ f
at 2 % = 2 % Δ f

X-Deflection: Setting amplitude:
± 10 V ≧ ± 0.5 V
± 1 V ≦ ± 1 V

Input impedance ≦ 25 kΩ for wobbulator operation.
Input impedance ≦ 50 kΩ for generator operation.

Blanking: RF blanking on flyback during sawtooth deflection.

Wobbulator frequency:

5 Hz...50 Hz for sawtooth deflection, with marker pip insertion + 10 ms test duration

Shape of deflection voltage:

Sawtooth/triangle

Amplitude modulation:

In the ranges 1...10 and wobbulator ranges 3/7/10;

Internal:

1 kHz 30/80 %
4 kHz 60 %

External:

100 Hz...10 kHz
0...90 %

For this purpose the RF output voltage is reduced by 6 dB (m= 0%, V_{RF} = 50 % V_{RF} AM modulation off)

Deviation in modulation depth:

≦ ± 3 dB, typically ≦ ± 1 dB

Frequency modulation:

FM generator operation at frequencies: 10.7 and 98 MHz
Additional at AS 5 F 5.5 MHz

Internal:

1 kHz, ± 15 kHz ± 40 kHz deviation
4 kHz, ± 30 kHz deviation
1 kHz + 19 kHz; ± 15 kHz+ ± 6 kHz deviation
1 kHz + 19 kHz; ± 40 kHz + ± 6 kHz deviation

External:

30 Hz...20 kHz; 0...80 kHz deviation

Tolerance of deviation at nominal frequency:

Typically ≦ ± 10 %

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RF output impedance:	75 Ω approx., unbalanced
RF voltage: (open circuit potential/-level)	Referred to 75 Ω termination and 75 Ω source impedance
	<u>EMF max.</u> ≦ 570 mV, ≧ 380 mV ≦ 115 dB (μV), ≧ 111 dB (μV) (level across 75 Ω - 6 dB = $\frac{\text{EMF}}{2}$)
	<u>EMF min.</u> ≦ 5 μV ≦ 14 dB (μV) 80 dB (μV) marker ± 3 dB at 98 MHz
	With the SU 753 A, AE 10 and AM 10 accessories, the aerial input signal may be additionally attenuated to suit sensitive receivers.
RF output voltage tolerance:	≦ ± 1 dB per frequency range ≦ ± 1 dB at maximum wobbulator deviation with 10% Δ f spacing from the wobbulator range limits
RF output divider:	Continuously variable 0...≧ 95 dB Switchable 0/3/6 dB
Ratio of harmonics of the unmodulated RF signal:	Referred to 75 Ω termination ≧ 20 dB, typically 28 dB

2.2.2 Audio Oscillator

Frequency:	1 kHz/ 4 kHz
Frequency tolerance:	± 25 %
Open circuit output voltage:	V_{rms} = 3 V
Tolerance of output voltage:	± 0.35 V
Output impedance:	10 kΩ
Tolerance of output impedance:	± 2 kΩ
Distortion factor:	D_{tot} ≦ 0.25 % Typically ≦ 0.03 % at 1 kHz

2.2.3 Frequency Meter

Frequency range:	50 kHz...199.99 MHz
Display:	4 1/2 positions
Display tolerance:	1 x 10^{-4} ± 1 digit
Range indication:	"F" for 19999 and between 10...20 MHz
Time base:	Quartz stabilised
Frequency tolerance:	≦ 1 x 10^{-4}
Temperature tolerance:	≦ 1 x 10^{-4}/ 1 K
Gate time:	10 ms
Sampling rate:	Adjustable 5...50 Hz, using wobbulator frequency selector + 10 ms gate time
Input voltage:	V_{in} rms ≧ 0.5 V, ≦ 5 V
Input impedance:	75 Ω approx., non-balanced

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2.2.4 Marker Generator

Type of marker:	Illuminated pip
Principle of marker Generation:	Stopping of X-deflection and measuring of frequency

2.2.5 Bias Potential

Voltage range:	0...≧ 15 V
Current:	≦ 5 mA Short circuit protected
Source impedance:	≦ 200 Ω

3. Accessories (as required)

G.UJ 75-11 Wide-band Balun Type SU 753 A

To match the unbalanced 75 Ω RF output of the AS 5 to the balanced 300 Ω aerial input of FM radio receivers. Simultaneoulsy, the AS 5 output signal is attenuated by approximately 20 dB.
Length of cable 1.8 m approx.

G.UJ 63-22 Artificial Aerial AM 10

To simulate the data of an aerial for AM receivers as per DIN 45 305, page 1. This is required for the exact input circuit alignment. Contains an additional attenuation of 20 dB.
Length of cable 1.8 m approx.

G.UJ 63-21 Artificial Aerial AE 10

To simulate the data fo a car aerial as per DIN 45 305, page 1 for 100 kHz...30 MHz and DIN 45 310, page 2 for VHF operation. Contains additional attenuation of 20 dB for VHF and 34 dB for LW, MW, SW. Switchable AM bands/VHF.
Length of cable 1.8 m approx.

G.UJ 75-01 Grip Terminal ZK 75

To supply the RF output signal to the object under test, e.g. to feed the wobbulated signal to an IF amplifier, IF discriminator or tuner. Contains coupling capacitor of 4700 pF and termination resistor of 75 Ω.
Length of cable 1.8 m approx.

G.US 43-10 Grip Terminal ZK 5

To connect to the low frequency voltage points at objects under test, e.g. to display pass band and discriminator curves. Contains decoupling resistor of 30 kΩ.
Length of cable 1.8 m approx.

G.US 11-10 Demodulator Test Prod DK 3

Rectifier test prod with switchable bandwidth and limit frequency. To demodulate RF signals. Specifically intended to display pass bands in the frequency range from 150 kHz...1000 MHz. Length of cable 1.0 m approx.

G.UJ 66-22 Connecting Cable L 76

Coaxial cable, having a 75 Ω impedance and fitted at both ends with BNC plugs. To connect the AS 5 to other units, fitted with BNC sockets. Length of cable 1.0 m approx.

H.UJ 71-03 Connecting Cable L 42

This is a twin-conductor flexible test lead with different coloured unbreakable banana plugs (containing socket for multi-connections). To connect the non-earthed control voltage to the object under test.

G.UB 30-02 Front Cover FH 1

This is a robust plastic cover for the AS 5 controls. It also serves as a transport container for connecting leads and test prods.

Additional accessories and exact specifications are contained in the "Test Gear - Accessories" brochure of GRUNDIG ELECTRONICS.

4. Operating Controls

Please fold out the last illustration at the end of this brochure.

(1) Mains switch; rocker switch construction. Top depressed = on, bottom depressed = off

Pre-set for non-earthed control voltages.

(2) This voltage is required when wobbulating controlled amplifiers as an external control potential.

(3) Output socket for non-earthed control voltage (4 mm telephone jack), protected against short circuits.

(4) Selector switch for the different methods of modulation.

(5) Coarse and fine controls to select marker frequency.

(6) Pilot bulb to indicate incorrect frequency range selection (7) when using the AS 5 as frequency meter.

Left-hand bulb lights up: rotate switch (7) anti-clockwise.

Right-hand bulb lights up: rotate switch (7) clockwise.

(7) Pre-set to select frequency range for wobbulator, generator and frequency meter.

(8) Digital frequency display with floating comma and range indication. Depending on the setting of switch (9), the appropriate marker frequency, generator frequency or, for frequency measurements, the input frequency are displayed.

Selector for the different operating methods
Wobbulator (AM modulated)
Generator (FM modulated)
Generator (AM modulated)
Frequency meter

(9)

Pre-set for wobbulator deviation, allows setting from 2...100 % Δ f of wobbulator frequency.

(10)

Input socket for the frequency under test during frequency meter operation.
Test range 50 kHz...199.99 MHz.

(11)

NOTE! Maximum input potential V_{rms} = 5 V

Pre-set for X-deflection voltage, adjustable between ± 1...± 10 V; simultaneously push-pull switch to select the signal shape of the wobbulator potential and of the X-deflection voltage.

(12)

Depressed: Sawtooth voltage
Pulled: Triangular voltage shape

Output socket for X-deflection voltage.

(13)

Audio socket

Audio output if switch (4) is set to modulated operation. (Open circuit output voltage V_{rms} = 3V)
Audio input for the external modulation of the generator in the "external" position of switch (4).

(14)

Switchable RF potential divider
To quickly attenuate the RF output voltage by a clearly defined 3 dB or 5 dB.

(15)

RF-output socket
EMF 570 mV max. ≧ 380 mV
Into 75 Ω = $\frac{EMF}{2}$

(16)

Continuously variable RF output potential divider, control range 0...≧95 dB

(17)

Pre-set to select wobbulator frequency from 5...50 Hz.
Simultaneously push-pull on/off switch for the digital frequency counter.

(18)

Coarse and fine setting to select RF generator frequency.

(19)

5. Setting Up For Use

5.1 Setting Up The Unit

The unit may be operated in any particular physical location (please refer to Specification, page 3).

Please observe, however, that the ventilation slots must not be covered. Excessive heat convection, from other units for example, must be avoided.

The carrying bracket of the AS 5 may be used to support the equipment in use. The carrying handle may be locked by tilting it towards the instrument base with simultaneous depression towards the hinge points.

5.2 Mains Connection

The AS 5 alignment generator is intended for operation from a 220 V, 50 Hz mains supply.

Connection of the unit which conforms to protection class II as per VDE 0411, DIN 57 411, part 1 is by means of a two-core mains lead withaout earthing contact.

5.3 Switching On

Depress the upper part of the switch rocker 1 to switch on the unit. Lighting up of the frequency display performs the function of a pilot bulb.

6. Applications/Special Features

6.1 Use of an Unmodulated RF Generator

Set up the unit as follows:

Rotary switch (4) (modulation) to its mid position "0".
Rotary switch (7) to the frequency range required.
Rotary switch (9) (method of operation) to "AM Generator".
Depress the push-pull switch (18).

The output socket (16) now delivers a signal, having a frequency displayed on the frequency display field (8). Simultaneously the correct range of the signal is indicated (kHz, respectively MHz).

The exact required frequency can now be set by means of the coarse and fine control (19).

Set the output voltage, using the RF output potential divider (17) to the value required. For wide band measurements, Q-value determinations, etc., use the switchable potential divider (15). It allows a 3 dB attenuation (LH position) or a 6 dB attenuation (RH position), from the original output level.

NOTE! When measuring low value RF output voltages, for example during sensitivity measurements at high performance receivers, then the steep slopes of the counter pulses may cause interference. In such a case disconnect the counter (18) after you have set the frequency required.

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6.2 Use as Modulated RF Generator

The RF potential, generated by the RF generator, may be amplitude modulated in all frequency ranges. For this purpose the carrier amplitude is reduced by 6 dB. Frequency modulation is possible in the ranges in which frequencies of 10.7 and 98 MHz are contained (also 5.5 MHz in the case of option I).

6.2.1 Internal Amplitude Modulation (all frequency ranges)

Carry out all adjustments as under 6.1 but in addition move switch (4) (modulation) in one of its three left-hand switch positions. The following modulation options are available:

Modulation frequency 1 kHz, modulation depth 30%

Modulation frequency 1 kHz, modulation depth 80%

Modulation frequency 4 kHz, modulation depth 60%

6.2.2 External Amplitude Modulation (all frequency ranges)

To modulate the generator frequency by a signal applied from outside, move switch (4) into its extreme right-hand switch position. The low frequency modulation signal (100 Hz...10 kHz) is fed to socket (14). A level of V_{rms} = 1 V results in a modulation depth of 30 %.

6.2.3 Internal Frequency Modulation (applies only to frequencies of 10.7 MHz and 98 MHz Additional at AS 5 F 5.5 MHz)

Make the same adjustments as explained under 6.1 but also set the operation selector (9) to its "FM Generator" position. Switch (4) allows selection between the following methods of modulation:

Modulation frequency 1 kHz, deviation ± 15 kHz

Modulation frequency 1 kHz, deviation ± 40 kHz

Modulation frequency 4 kHz, deviation ± 30 kHz

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For work on stereo receivers, two further positions are provided whereby the carrier is also modulated by a quartz stabilised 19 kHz pilot tone, in addition to the AM modulation.

Modulation frequency 1 kHz/19 kHz, deviation ± 15 kHz/± 6 kHz

Modulation frequency 1 kHz/19 kHz, deviation ± 40 kHz/± 6 kHz

6.2.4 External Frequency Modulation

(applies only to frequencies of 10.7 MHz and 98 MHz Additional at AS 5 F 5.5 MHz)

To modulate the generator frequency by means of an external signal, set switch 4 to its extreme right-hand switch position and supply the low frequency modulation signal (30 Hz...20 kHz) to socket (14). A level of 1 V_{rms} produces a deviation of ± 15 kHz. The maximum deviation is ± 80 kHz.

6.3 Use as Audio Generator

Socket (14) always supplies an audio signal of 1 kHz, respectively 4 kHz when switch (4) is not set to its "0" or to its "EXTERNAL" position.

The pilot tone frequency of 19 kHz cannot be taken out.

The open circuit output potential is V_{rms} = 3 V (source impedance 10 kΩ).
The output is protected against short circuits.

6.4 Use As Wobbulator-Generator

During wobbulator operation of the AS 5, the RF generator frequency is made to vary between a reference point and an end point by means of a control potential rising under a linear law.

The "wobbulator deviation" (pre-set (10)) is now a measure for the magnitude of the frequency variation whereby the wobbulator frequency (control (18)) indicates the repetition of the periods per unit of time.

In the case of sawtooth wobbulation (switch (12) depressed), the control voltage is brought back to the reference level very soon after reaching the end point. The RF signal is blanked throughout the flyback so that no RF signal is obtained during the back scan of the control signal.

In the case of the control voltage having a triangular shaped law (switch (12) not depressed), the time from the reference point to the end point and back is equally long, there is no signal blanking.

NOTE! When wobbulating using a triangular shaped signal, no frequency markers are generated.

The AS 5 frequency ranges which may be wobbulated have been selected in such a manner that practically all RF and IF stages of conventional radio receivers may be covered.

Make the following adjustments for wobbulator operation:

Range switch (7) To the required frequency range which may be wobbulated. The three ranges where this is possible are identified by a square mark.

Range switch (9) Set the range selector to its left-hand position "AM wobbulator".

Control (10) "Wobbulator deviation". Set this control in accordance with the bandwidth of the object under test so that the curve is shown in its full width.

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Socket (13)

This is connected using a coaxial cable (connecting cable L 76) with the X-amplifier input of the oscilloscope or display unit. The input coupling selector should be set to DC coupling.

Rotary switch (12)

This is the "X-amplitude" selector. Adjust its position in such a manner that the full display width is being scanned.

Attenuator (15) and RF Divider (17)

Set to the required output potential. Do not overdrive object under test.

RF Socket (16)

This is connected with the object under test. The following accessories may have to be used (please refer to section 3. Accessories):

Wideband Balun SU 753 A, Artificial Aerial AM 10/AE 10, Grip Terminal ZK 75, Connecting Cable L 76.

NOTE! Keep DC potentials from the RF output!

Control (18)

Set the required deflection speed, depending on the object under test. The correct setting is found by wobbulating, using a non-blanked triangular voltage shape. For this purpose pull the push-pull switch (12). If the deflection speed is too great, then twin displays of the pass band result.

Control (19)

This is used to select the centre generator frequency. With pre-set (10) set to maximum, maximum deviation results and the full frequency band is wobbulated. In such a case control (19) has no effect.

NOTE! The display (8) shows the marker frequency, not the generator centre frequency when using the sawtooth deflection voltage (please refer to 6.4.2.).

6.4.1 Wobbulation of Controlled Amplifiers

Various amplifiers have special control circuits (delayed control, keyed control) which have an effect on the amplifier gain control. When wobbulating such equipment always ensure that no gain variations occur during the process of wobbulation. For this purpose the amplifier control must be made inoperative. The control circuit is then opened for this purpose and a fixed control potential is supplied to the component responsible for gain control (refer to the set manufacturer). For this purpose socket (3) supplies a DC potential, free from any chassis connection, the level of which may be set by control (2).

The DC potential is also used to shift the threshold of a demodulated RF signal during wobbulator operation.

6.4.2 Measurement of Marker Frequency

The AS 5 alignment generator replaces the conventional marker frequency generator by a digital frequency meter.

To measure the frequency at any particular point of a wobbulator curve, a light marker pip is generated at this point by stopping the frequency control voltage and by measuring the frequency of the wobbulator RF generator reached at that precise moment in time.

The marker pip may be selected within any particular wobbulator range, using control (5). Display of the marker frequency is on display field (8), using a floating comma and with range indication. The push-pull switch (18) is depressed for this purpose!

NOTE! The marker pip itself as well as the corresponding frequency display only appear if pre-set (5) is set to a frequency which is within the frequency range covered by the wobbulator deviation. In all other cases no marker pip will appear on the wobbulator curve and the display (8) of the AS 5 display a value of "0".

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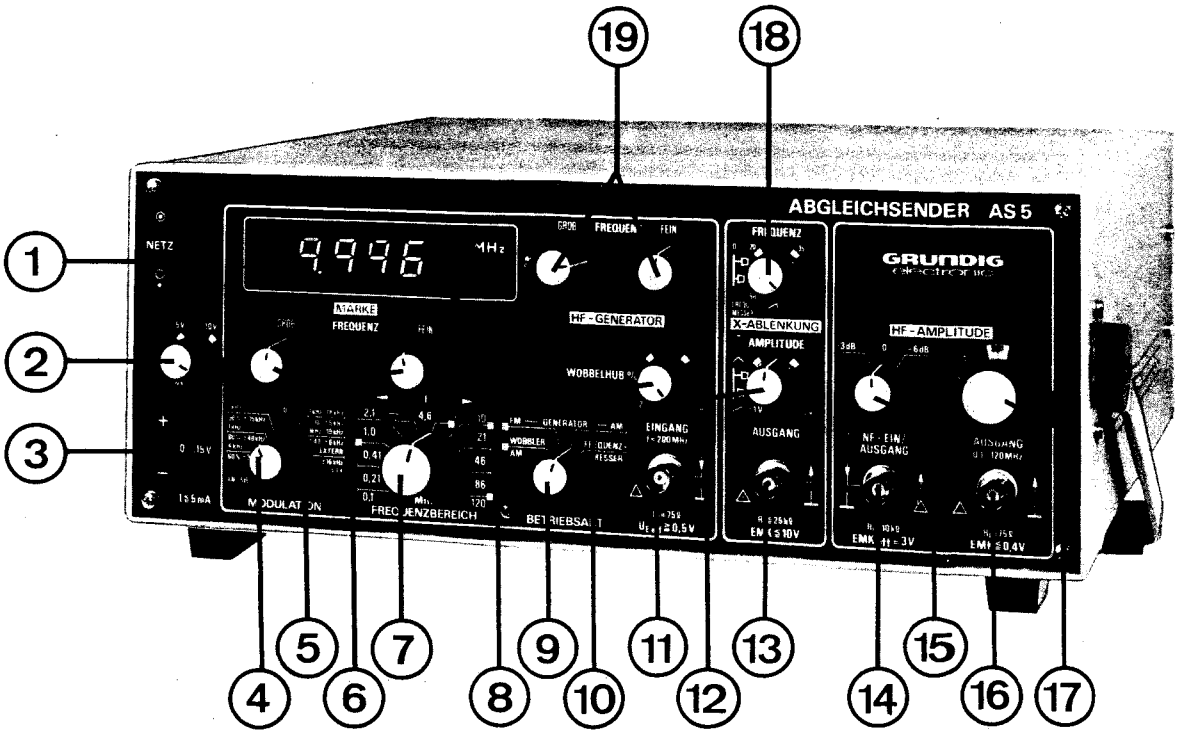
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ABGLEICHSENDER AS 5
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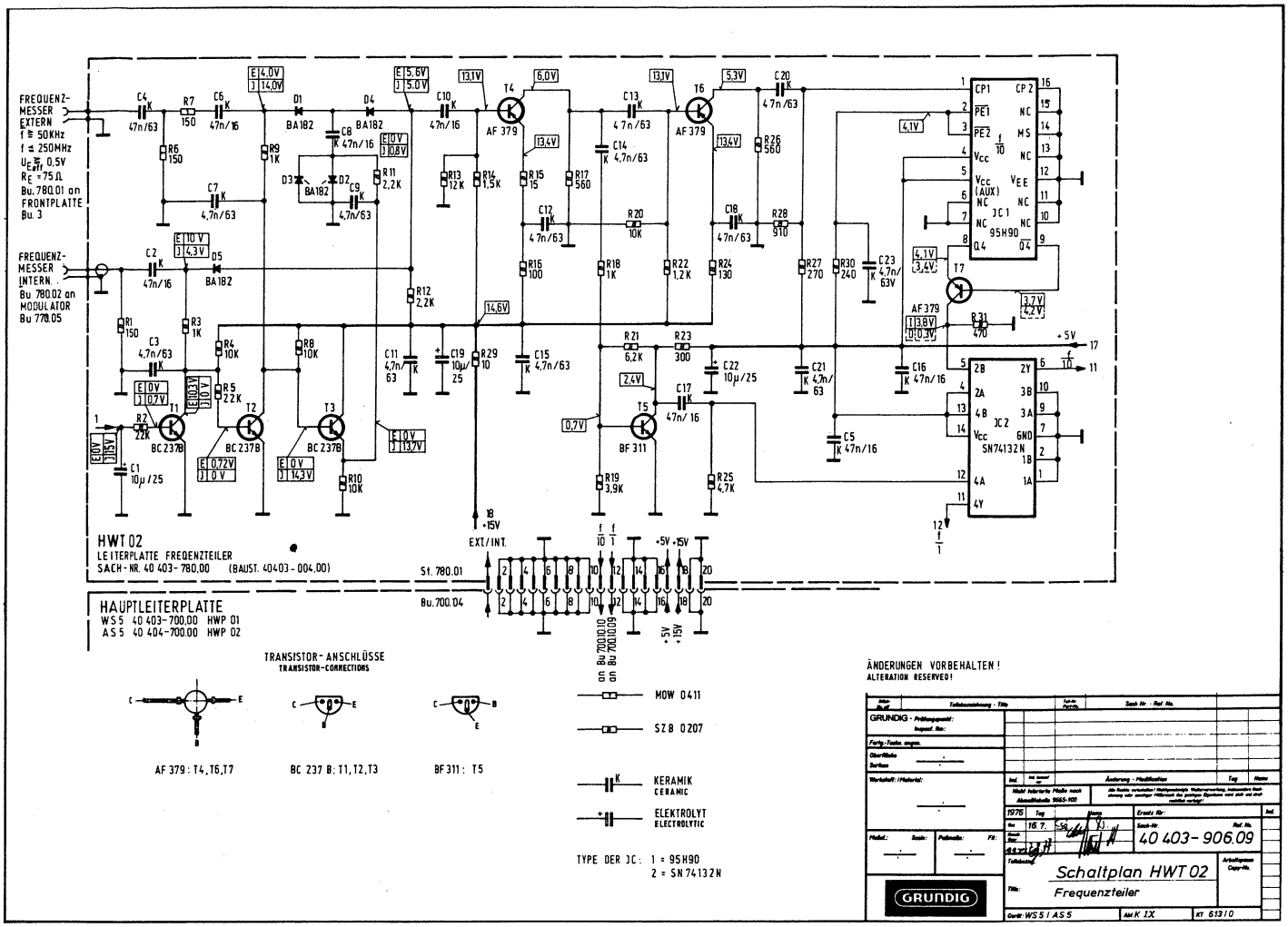
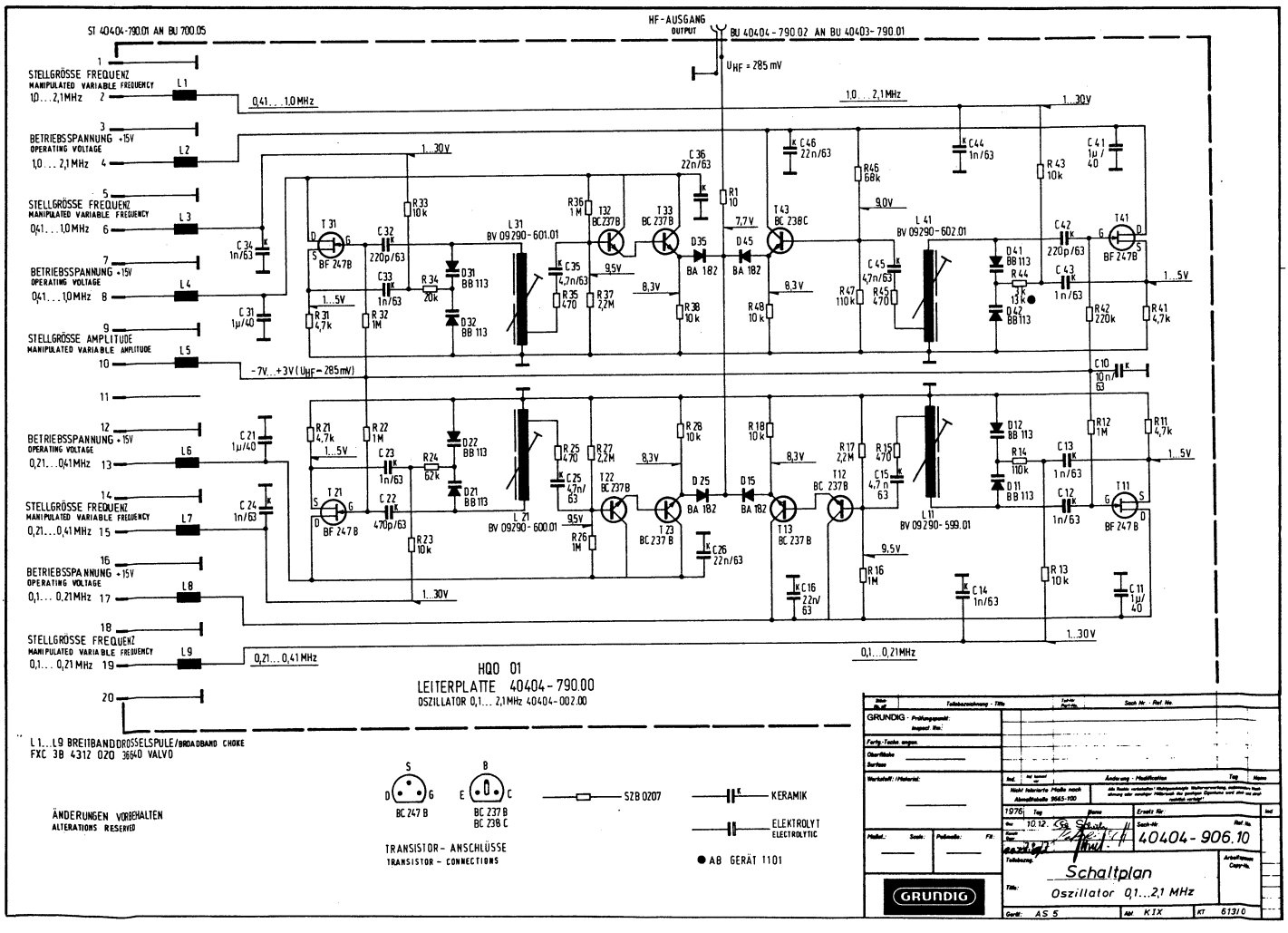
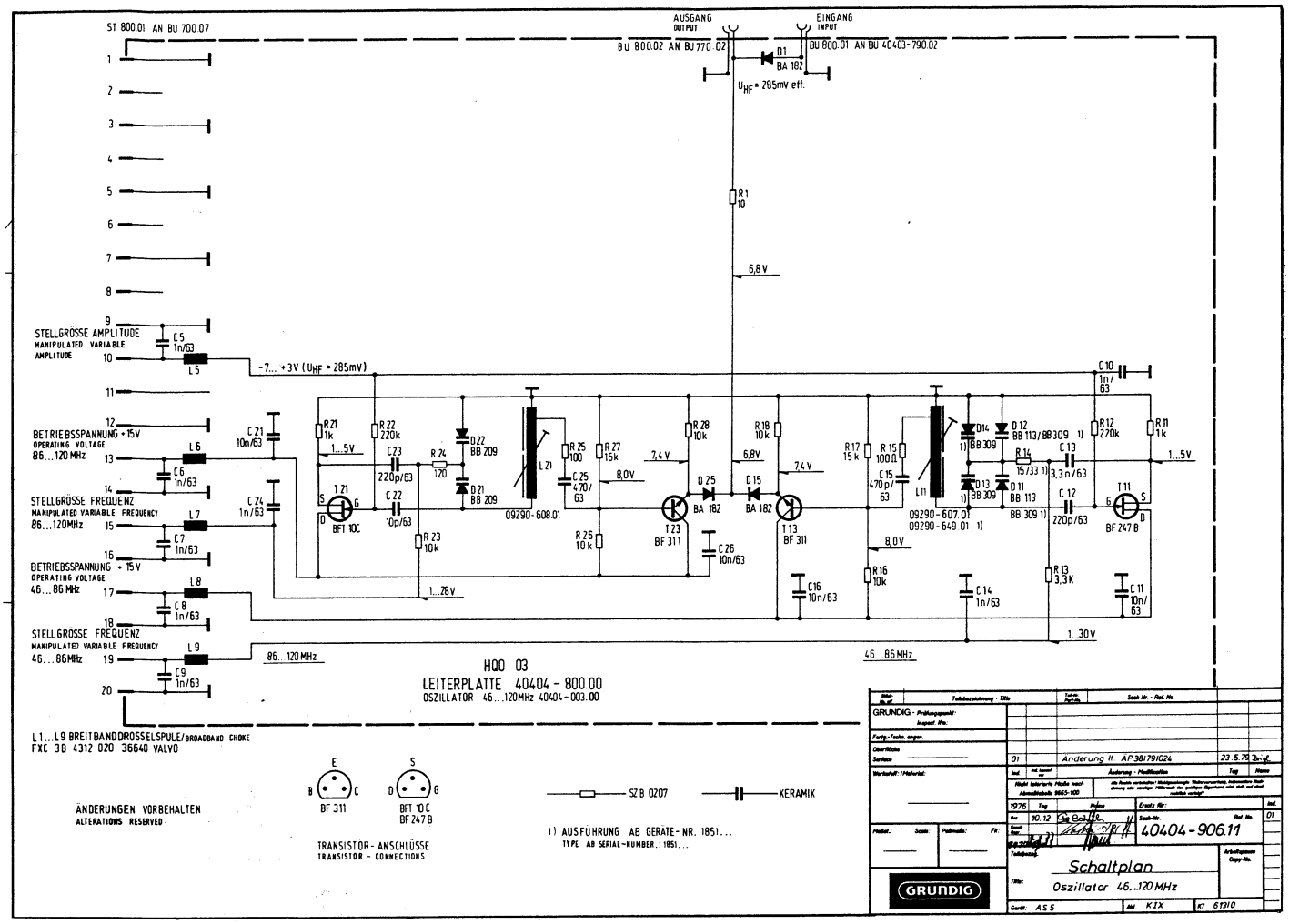
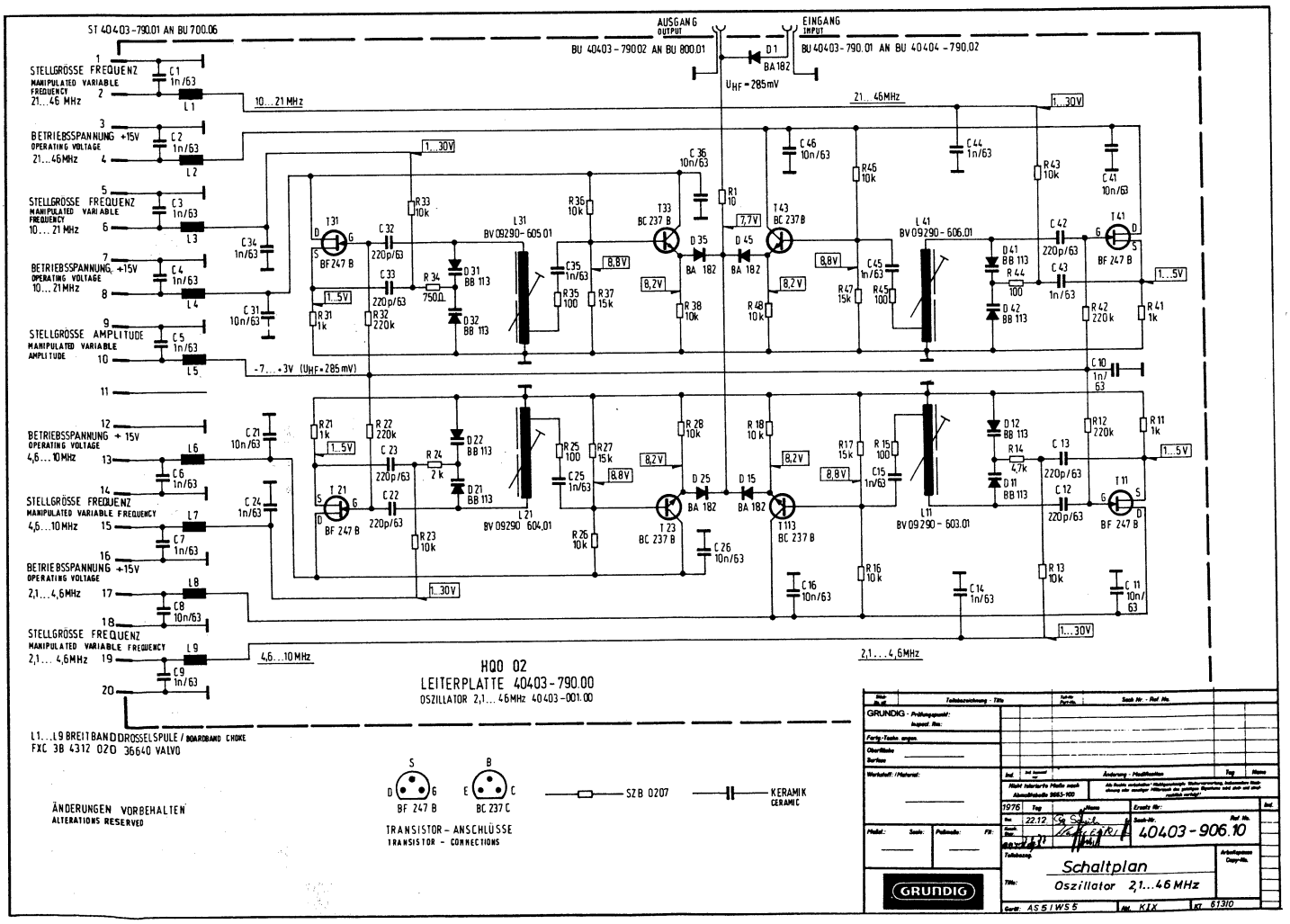
MARKE
FREQUENZ
HF-GENERATOR
WOBBELHUB
X-ABLENKUNG
AMPLITUDE
HF-AMPLITUDE
GRUNDIG
AUSGANG
EINGANG
MODULATION
FREQUENZBEREICH
BETRIEBSART


FREQUENZ-MESSER EXTERN
f ≤ 50KHz
f ≤ 250MHz
U_{eff} ≥ 0,5V
R_E = 75Ω
Bu. 780.01 an FRONTPLATTE Bu. 3
FREQUENZ-MESSER INTERN
Bu 780.02 an MODULATOR Bu 778.05
HWT 02
LEITERPLATTE FREQENZTEILER
SACH-NR. 40 403-780.00 (BAUST. 40403-004.00)
St. 780.01
Bu. 700.04
EXT/INT.
on Bu 700.01.01 on Bu 700.01.03
HAUPTLEITERPLATTE
WS 5 40 403-700.00 HWP 01
AS 5 40 404-700.00 HWP 02
TRANSISTOR-ANSCHLÜSSE
TRANSISTOR-CONNECTIONS
AF 379: T4, T6, T7
BC 237 B: T1, T2, T3
BF 311: T5
MOW 0411
SZB 0207
KERAMIK
CERAMIC
ELEKTROLYT
ELECTROLYTIC
TYPE DER IC: 1 = 95H90
2 = SN 74132N
ÄNDERUNGEN VORBEHALTEN!
ALTERATION RESERVED!
GRUNDIG
Schaltplan HWT 02
Frequenzteiler
40 403-906.09


ST 40404-790.01 AN BU 700.05
HF-AUSGANG
OUTPUT
BU 40404-790.02 AN BU 40403-790.01
U_{HF} = 285 mV
STELLGRÖSSE FREQUENZ
MANIPULATED VARIABLE FREQUENCY
1,0...2,1MHz
0,41...1,0MHz
BETRIEBSSPANNUNG +15V
OPERATING VOLTAGE
STELLGRÖSSE AMPLITUDE
MANIPULATED VARIABLE AMPLITUDE
-7V...+3V (U_{HF} = 285mV)
0,21...0,41MHz
0,1...0,21MHz
HQO 01
LEITERPLATTE 40404-790.00
OSZILLATOR 0,1...2,1MHz 40404-002.00
L1...L9 BREITBANDDROSSELSPULE/BROADBAND CHOKE
FXC 3B 4312 020 36640 VALVO
BC 247 B
BC 237 B
BC 238 C
SZB 0207
KERAMIK
ELEKTROLYT
ELECTROLYTIC
● AB GERÄT 1101
TRANSISTOR-ANSCHLÜSSE
TRANSISTOR-CONNECTIONS
ÄNDERUNGEN VORBEHALTEN
ALTERATIONS RESERVED
GRUNDIG
Schaltplan
Oszillator 0,1...2,1 MHz
40404-906.10


ST 800.01 AN BU 700.07
AUSGANG
OUTPUT
EINGANG
INPUT
BU 800.02 AN BU 770.02
BU 800.01 AN BU 40403-790.02
D1
BA 182
U_{HF} = 285mV eff.
R1
10
6,8V
STELLGRÖSSE AMPLITUDE
MANIPULATED VARIABLE AMPLITUDE
C5
1n/63
L5
-7... +3V (U_{HF} = 285mV)
BETRIEBSSPANNUNG +15V
OPERATING VOLTAGE
86...120 MHz
L6
C6
1n/63
STELLGRÖSSE FREQUENZ
MANIPULATED VARIABLE FREQUENCY
86...120MHz
L7
C7
1n/63
BETRIEBSSPANNUNG +15V
OPERATING VOLTAGE
46...86 MHz
L8
C8
1n/63
STELLGRÖSSE FREQUENZ
MANIPULATED VARIABLE FREQUENCY
46...86MHz
L9
C9
1n/63
86...120MHz
46...86MHz
C21
10n/63
C24
1n/63
R21
1k
R22
220k
R23
10k
R24
120
C22
10p/63
C23
220p/63
D21
BB 209
D22
BB 209
T21
BF 110
L21
09290-608.01
R25
100
C25
470/63
R26
10k
R27
15k
8,0V
7,4V
R28
10k
D25
BA 182
T23
BF 311
C26
10n/63
R18
10k
6,8V
D15
BA 182
T13
BF 311
C16
10n/63
R17
15k
R15
100/1
C15
470p/63
L11
09290-607.01
09290-649.01 1)
D14
BB 309
D12
BB 113/BB309 1)
D13
BB 309
D11
BB 113
BB 309 1)
R14
15/33 1)
C13
3,3n/63
C12
220p/63
T11
BF 247 B
R12
220k
R11
1k
C10
1n/63
R16
10k
C14
1n/63
R13
3,3k
C11
10n/63
1...5V
1...28V
1...30V
8,0V
L1...L9 BREITBANDDROSSELSPULE/BROADBAND CHOKE
FXC 3B 4312 020 36640 VALVO
ÄNDERUNGEN VORBEHALTEN
ALTERATIONS RESERVED
E
B
C
BF 311
S
D
G
BF 110 C
BF 247 B
TRANSISTOR-ANSCHLÜSSE
TRANSISTOR - CONNECTIONS
SZB 0207
KERAMIK
1) AUSFÜHRUNG AB GERÄTE-NR. 1851...
TYPE AB SERIAL-NUMBER.: 1851...
HQO 03
LEITERPLATTE 40404-800.00
OSZILLATOR 46...120MHz 40404-003.00
GRUNDIG - Prüfungsamt/
Inspect. No.:
Änderung II AP 38179/024
23.5.79
Änderung - Modification
Tag
Name
Ersatz für:
10.12
40404-906.11
Schaltplan
Oszillator 46...120 MHz
GRUNDIG
Gerät: AS 5
KTX
KT 61310


ST 40403-790.01 AN BU 700.06
AUSGANG
OUTPUT
EINGANG
INPUT
BU 40403-790.02 AN BU 800.01
BU 40403-790.01 AN BU 40404-790.02
D1
BA 182
U_{HF} = 285mV
STELLGRÖSSE FREQUENZ
MANIPULATED VARIABLE FREQUENCY
21...46 MHz
L1
C1
1n/63
10...21 MHz
BETRIEBSSPANNUNG +15V
OPERATING VOLTAGE
21...46MHz
L2
C2
1n/63
STELLGRÖSSE FREQUENZ
MANIPULATED VARIABLE FREQUENCY
10...21 MHz
L3
C3
1n/63
BETRIEBSSPANNUNG +15V
OPERATING VOLTAGE
10...21 MHz
L4
C4
1n/63
STELLGRÖSSE AMPLITUDE
MANIPULATED VARIABLE AMPLITUDE
L5
C5
1n/63
-7...+3V (U_{HF}=285mV)
BETRIEBSSPANNUNG +15V
OPERATING VOLTAGE
4,6...10MHz
L6
C6
1n/63
STELLGRÖSSE FREQUENZ
MANIPULATED VARIABLE FREQUENCY
4,6...10MHz
L7
C7
1n/63
BETRIEBSSPANNUNG +15V
OPERATING VOLTAGE
2,1...4,6MHz
L8
C8
10n/63
STELLGRÖSSE FREQUENZ
MANIPULATED VARIABLE FREQUENCY
2,1...4,6MHz
L9
C9
1n/63
4,6...10MHz
2,1...4,6MHz
21...46MHz
C34
1n/63
C31
10n/63
T31
BF 247 B
C32
220p/63
C33
220p/63
R33
10k
R34
750Ω
R31
1k
R32
220k
D31
BB 113
D32
BB 113
L31
BV 09290-605.01
R36
10k
C35
1n/63
R35
100
R37
15k
8,8V
8,2V
T33
BC 237 B
C36
10n/63
R1
10
D35
BA 182
D45
BA 182
7,7V
T43
BC 237 B
R48
10k
C46
10n/63
R45
10k
C45
1n/63
R47
15k
R45
100
L41
BV 09290-606.01
C44
1n/63
R43
10k
C41
10n/63
C42
220p/63
T41
BF 247 B
D41
BB 113
R44
100
C43
1n/63
D42
BB 113
R42
220k
R41
1k
1...5V
1...30V
C21
10n/63
C24
1n/63
R21
1k
R22
220k
R24
2k
C22
220p/63
C23
220p/63
D21
BB 113
D22
BB 113
T21
BF 247 B
L21
BV 09290-604.01
R25
100
C25
1n/63
R27
15k
R26
10k
R23
10k
R28
10k
D25
BA 182
T23
BC 237 B
C26
10n/63
R18
10k
D15
BA 182
T113
BC 237 B
C16
10n/63
R17
15k
R15
100
C15
1n/63
L11
BV 09290-603.01
D12
BB 113
R14
4,7k
D11
BB 113
C13
220p/63
C12
220p/63
T11
BF 247 B
R12
220k
R11
1k
C10
1n/63
R16
10k
C14
1n/63
R13
10k
C11
10n/63
L1...L9 BREITBANDDROSSELSPULE / BOARDBAND CHOKE
FXC 3B 4312 020 36640 VALVO
ÄNDERUNGEN VORBEHALTEN
ALTERATIONS RESERVED
S
D
G
BF 247 B
B
E
C
BC 237 C
TRANSISTOR-ANSCHLÜSSE
TRANSISTOR - CONNECTIONS
SZB 0207
KERAMIK
CERAMIC
HQO 02
LEITERPLATTE 40403-790.00
OSZILLATOR 2,1...46MHz 40403-001.00
GRUNDIG - Prüfungsamt/
Inspect. No.:
Änderung - Modification
Tag
Name
Ersatz für:
22.12
40403-906.10
Schaltplan
Oszillator 2,1...46 MHz
GRUNDIG
Gerät: AS 5 / WS 5
KTX
KT 61310

MC-Service

LO1/02
FXC 3B 4312-020-36640 VALVO

LO1
PMP/S 42572 32091 ITT

STROMVERSORGUNG
POWER SUPPLY
HWP 03 40403-750.00/40403-006.00

STROMVERSORGUNG:
TRANSISTOR ANSCHLÜSSE
POWER SUPPLY:
TRANSISTOR CONNECTIONS

E C B
BD 136-10

B C E
GD 204

SCHALTER BETRIEBSART S23
SWITCH FUNCTION

UMSCHALTUNG FÜHRUNGSGRÖSSE: WOBBELN/GENERATOR (SÄGEZAHN, DREIECK/GLEICHSPANNUNG) SWITCH CONTROL INPUT: SWEEP/GENERATOR (RAMP, TRIANGLE/DC)		UMSCHALTUNG GENERATOR/FREQUENZMESSERBETRIEB SWITCH GENERATOR/FREQUENCY METER
MESSBEREICH FREQUENZMESSER: WOBBELN, FM/AM FREQUENCY METER RANGE: SWEEP, FM/AM	UMSCHALTUNG MARKE 1/2 SWITCH MARK 1/2	MARKENLOGIK UMSCHALTUNG: WOBBELN/GENERATOR MARK-LOGIC SWITCH: SWEEP/GENERATOR
UMSCHALTUNG NF (AM/FM) SWITCH AF (AM/FM)	UMSCHALTUNG LINEARISIERUNG WOBBEL, FM/AM SWITCH LINEARIZATION SWEEP, FM/AM	0dB-SCHALTER, FM-MODULATION 0dB SWITCH, FM-MODULATION

SCHALTKAMMER
CONTACT PLATE: 3, 2, 1

KONTAKTE: 1 - 4 | 5 - 8 | 9 - 12
CONTACTS

BETRIEBSARTENSCHALTER AS 5 40404-035.00	SCHALTERSTELLUNG 1	2	3	4
	WOBBELN	GENERATOR FM	GENERATOR AM	FREQUENZMESSER

FREQUENZTEILER
FREQUENCY DIVIDER
HWT 02 40403-780.00/40403-004.00

OSZILLATOR
OSCILLATOR
WS 5: 2,1...46MHz / HOD 02 40403-790.00/-001.00
AS 5: 0,1...23MHz / HOD 01 40404-790.00/-002.00

FREQUENZMESSER
FREQUENCY METER
HWT 01 40403-710.00

FREQUENZMESSER
FREQUENCY METER
HWT 01 40403-710.00

BEDIENUNGSTEIL
CONTROL UNIT
HWB 01 40403-730.00

KONSTANTSPANNUNGSQUELLE ± 10V
VOLTAGE REGULATOR ± 10

PRÜFBUCHSEN
TIP JACKS

ERDFREIE SPANNUNG (ZUM BEDIENTEIL) 18V
FLOATING VOLTAGE (TO CONTROL UNIT) 18V

NF-OSZILLATOR
AF - OSCILLATOR

TIEFPASS
LOW-PASS-FILTER

LINEARISIERUNG
LINEARIZATION
2) 3): HWZ 02 40404-720.00 (WS: HWZ 01 40403-720.00) BU 720.14
4): HWZ 03 40404-710.00 BU 710.14

SCHALTER MODULATION S21
SWITCH MODULATION

SCHALTER FREQUENZBEREICH S22
SWITCH FREQUENCY RANGE

SCHALTER BETRIEBSART S23
SWITCH FUNCTION

MODULATIONSARTENSCHALTER AS 5 40404-035.00	MOD. ART WOBB/AM FM/NUB	SCHALTERSTELLUNG/MODULATION 1	2	3	4	5	6	7
		4kHz/60% 4kHz/r.30kHz	1kHz/80% 1kHz/r.40kHz	1kHz/30% 1kHz/r.15kHz	AUS	1kHz/30% 1kHz/r.5kHz ±5	1kHz/80% 1kHz/r.5kHz ±6	EXT
		4kHz/60% 4kHz/r.30kHz	1kHz/80% 1kHz/r.40kHz	1kHz/30% 1kHz/r.15kHz	AUS	1kHz/30% 1kHz/r.5kHz ±5	1kHz/80% 1kHz/r.5kHz ±6	EXT

BEREICHSSCHALTER AS5 S22 40404-035.00	BETRIEBSART GENERATOR AM GEN.FM/WOBB	SCHALTERSTELLUNG/FREQUENZBEREICH 1	2	3	4	5	6	7	8	9	10	11	12	
		0,1÷0,21÷0,41÷1,0÷2,1÷4,6÷10÷21÷46÷85÷170												MHz
		0,09÷0,54 FM 2)				0,35÷2,9 2)5)		0,95÷12,5 5)		30÷45		815÷1260		MHz

1) ENTFÄLLT BEIM AS5
REMOVED AT AS5

2) AUSFÜHRUNG TYPE GERÄTE-NR 1001...1100 SERIAL-NUMBER 1001...1100

3) AUSFÜHRUNG TYPE GERÄTE-NR. 1101...1200 SERIAL NUMBER 1101-1200

4) AUSFÜHRUNG TYPE GERÄTE-NR 1201... SERIAL-NUMBER 1201...

5) OPTION

Nr.	Änderung - Modifikation	Datum	Name
02	Änderung II AP 091781178	9.11.78	
01	Änderung II AP 091771178	29.11.77	

GRUNDIG - Prüfvorgesetzt: Abgenommen: Datum:
Fertig-Techn. eingeh.
Oberstelle
Serbien
Werkstoff/Material:
Bearb.
Prüfende: 9/77
Prüfvermerk

Schaltplan
Hauptplatte HWP 02

Ersatz für:
Ersatz durch:
Blatt: AS 5 Bl. K IX 87

40404-906.01 Bl. 02
Blätter: 2

Weiter Schutzrecht-Vermerk nach Abmeldevorschrift DIN 34 beachten
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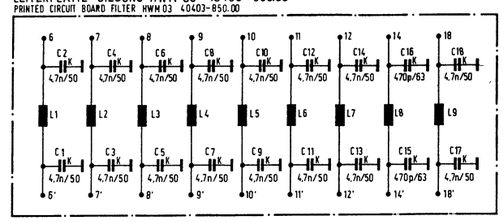
MC-Service

LEITERPLATTE SIEBUNG HWM 03 40403-850.00
PRINTED CIRCUIT BOARD FILTER HWM 03 40403-850.00



SZB 0207
MSW 0207 TK 50 1%
MSW 0207 TK 50 2%
MSW 0207 TK 50 0,1%
F FKC
K KERAMIK CERAMIC
M MKS
ELEKTROLYT ELECTROLYTIC
T TANTAL-ELEKTROLYT TANTALE-ELECTROLYTIC

TRANSISTOR-ANSCHLÜSSE
TRANSISTOR-CONNECTIONS
BC 237 B
BC 238 (BV 9654-464.97)
BC 307 B
BC 327-25
BC 337-25

OSZILLATOR OSCILLATOR
WS 5: 0,39-0,54 / 46-240 MHz / HQO 04 40403-800.00 / -002.00
AS 5: 2,1-46 MHz / HQO 02 40403-790.00 / -001.00

OSZILLATOR OSCILLATOR
WS 5: 240-860 MHz / HQO 05 40403-810.00 / -003.00
AS 5: 46-120 MHz / HQO 03 40404-800.00 / -003.00

MODULATOR MODULATOR
WS 5: HWM 01 40403-770.00 / 40403-005.00
AS 5: HWM 02 40404-770.00 / 40404-004.00

HWM 03
40403-850.00

GEHÄUSEMASSE CASE

FREQUENZMESSER FREQUENCY METER

ISTWERT OSZILLATOR CONTROL-POINT-OSCILLATOR

ISTWERT-OSZILLATOR CONTROL-POINT-OSCILLATOR

SERVICESTELLER (OSZ. AMPL.) SERVICE-ADJUSTER (OSC.-AMPL.)

SOLLWERT (OSZ.-AMPL.) SET-POINT (OSC.-AMPL.) > 130 MHz

SOLLWERT (OSZ. AMPL.) SET-POINT (OSC.-AMPL.) < 130 MHz

AMPLITUDENREGELUNG OSZILLATOREN > 130 MHz
OSCILLATOR AMPLITUDE CONTROL > 130 MHz

AMPLITUDENREGELUNG OSZILLATOREN < 130 MHz
OSCILLATOR AMPLITUDE CONTROL < 130 MHz

MODULATOR ARBEITSPUNKT OPERATING POINT

AMPLITUDENREGELUNG MODULATOR
MODULATOR AMPLITUDE CONTROL

MODULATOR ISTWERT MODULATOR CONTROL-POINT

SOLLWERT MODULATOR MODULATOR-SET-POINT

QUARZOSZILLATOR
CRYSTAL OSCILLATOR

BEGRENZERVERSTÄRKER
LIMITING AMPLIFIER

SÄGEZAHNRÜCKLAUF AUSTASTUNG > 130 MHz
RAMP FLYBACK KEYING OFF > 130 MHz

SÄGEZAHNRÜCKLAUF AUSTASTUNG < 130 MHz
RAMP FLYBACK KEYING OFF < 130 MHz

ÄNDERUNGEN VORBEHALTEN!
ALTERATIONS RESERVED

GRUNDIG

Änderung II AP 09178 I. 178 — 9.11.78
Änderung II. AP 09177 I 178 — 29.11.77

Schaltplan
Hauptplatte HWP 02

20404-9060 IBl 2
Blatt/Nr. 2

DIODEN VORSPANNUNGSERZEUGUNG
DIODES BIAS VOLTAGE

LINEARISIERUNG BEREICH 3
LINEARIZATION RANGE 3

LINEARISIERUNG BEREICH 6
LINEARIZATION RANGE 6

LINEARISIERUNG BEREICH 7
LINEARIZATION RANGE 7

LEITERPLATTE HWZ 02
CIRCUIT-BOARD HWZ 02
40404 - 720.00

KODIERPLATTE C CODE-CIRCUIT-BOARD C 40403-840.00

LINEARITÄT LINEARITY
ABGLEICHPUNKT ADJUSTMENT POINT
FREQUENZBEREICH 3
FREQUENCY-RANGE 3
R = 13Ω - 620 KΩ

FREQUENZBEREICH 6
FREQUENCY-RANGE 6
R = 13Ω - 620 KΩ

FREQUENZBEREICH 7
FREQUENCY-RANGE 7
R = 13Ω - 620 KΩ

HAUPTPLATTE HWP02
MAIN-CIRCUIT-BOARD HWP 02
40404 - 700.00

S22 SK3
FREQUENZBEREICH
FREQUENCY-RANGE

S23 SK1
BETRIEBSART
FUNCTION

S22 SK1/1

JC 8/9 + JC10/11 + JC12/13 =
1 = SN72 LO 44
ODER/or 2 = SN72 LO 22

Schaltplan
Linearisierung I Geräte 1001 - 1100

40404-906 03 Bl. 1
Blätter: 5

GRUNDIG

LINEARISIERUNG BEREICH 8
LINEARIZATION RANGE 8

LEITERPLATTE HWZ 02
CIRCUIT-BOARD HWZ 02
40404-720.00

LINEARISIERUNG BEREICH 10
LINEARIZATION RANGE 10

FM-NF-ADDITION
FM-LF-ADDITION

LINEARISIERUNG
LINEARIZATION

FREQUENZBEREICH-ENDE
FREQUENCY-RANGE-END

ENDSTUFE
OUTPUT-AMPLIFIER

FREQU-BEREICH-ANFANG
FREQUENCY-RANGE-BEGIN

KODIERPLATTE C 2) CODE-CIRCUIT-BOARD C 2) 40403-840.00

KODIERPLATTE C CODE-CIRCUIT-BOARD C 40403-840.00

KODIERPLATTE B CODE-CIRCUIT-BOARD B 40403-830.00

KODIERPLATTE A CODE-CIRCUIT-BOARD A 40403-820.00

1) ENTFÄLLT WENN BEREICH 8 LINEARISIERT
2) ENTFÄLLT WENN BEREICH 8 NICHT LINEARISIERT
3) ENTFÄLLT WENN BEREICH 11 NICHT BESTÜCKT
5) AB GERÄT-NR.: 1551

1) OMITTED IF RANGE 8 LINEARIZED
2) OMITTED IF RANGE 8 NOT LINEARIZED
3) OMITTED IF RANGE 11 NOT EQUIPED
5) FROM SETS FROM SERIAL-No.: 1551

TRANSISTOR-ANSCHLÜSSE
TRANSISTOR-CONNECTIONS

BC 307 B
BC 327-25
BC 337-25

BC 238 nach BV 9654-464.97

MSW 0207 2%
MSW 0207 0,25%
MSW 0207 1%
SZB 0207
ELEKTROLYT ELECTROLYTIC
KERAMIK CERAMIC

ÄNDERUNGEN VORBEHALTEN!
ALTERATIONS RESERVED!

TD 68 nach BV 9654-465.97

GRUNDIG

1977 Nr. 10.

204-04-906.03 Bl. 2
Blätter: 5

Schaltplan
Linearisierung I Geräte 1001-1100

Gerät AS 5

BEREICH 3
RANGE 3

SCHALTER WOBB./AM
SWITCH SWEEP/AM

BEREICH 7
RANGE 7

KODIERPLATTE B 40403-830.00 CODE-CIRCUIT-BOARD 40403-830.00
FREQUENZBEREICH (ENDE) FREQUENCY RANGE (END)

KODIERPLATTE A 40403-820.00 CODE-CIRCUIT-BOARD 40403-820.00
FREQUENZBEREICH (ANFANG) FREQUENCY RANGE (BEGIN)

ALLE TRANSISTOREN BC 238
ALL TRANSISTORS BC 238
BV 9654-464.97

HAUPTPLATTE HWP 02
40404-790.00
MAIN-CIRCUIT-BOARD HWP 02
40404-790.00

S22 SK3
FREQUENZBEREICH
FREQUENCY-RANGE

S23 SK1
BETRIEBSART
FUNCTION

WOBB.
FM
AM

FM-NF-ADDITION
FM-LF-ADDITION

FREQUENZBEREICH ENDE
FREQUENCY-RANGE-END

FREQUENZBEREICH ANFANG
FREQUENCY-RANGE-BEGIN

ENDSTUFE
OUTPUT AMPLIFIER

LEITERPLATTE HWZ 02
CIRCUIT BOARD HWZ 02
40404-720.01

TRANSISTOR-ANSCHLÜSSE
TRANSISTOR-CONNECTIONS

ALLE TRANSISTOREN
ALL TRANSISTORS

MSW 0207 1%
MSW 0207 2%
MSW 0207 0,25%
SZB 0207

ELEKTROLYT
ELECTROLYTIC
KERAMIK
CERAMIC

ÄNDERUNGEN VORBEHALTEN!
ALTERATIONS RESERVED!

5) AB GERÄT-NR. 1551

5) FOR SETS FROM SERIAL-No. 1551

GRUNDIG

Änderung 11. AP 09177/166 25.10.77

1977 24.10.

Gerät Nr. 40403-906.03

40404-906.03 Bl.3

Blätter: 5

Schaltplan

Linearisierung/Geräte:1101 – 1200

AS 5

MC-Service

NF-ABGLEICH
LF-CAL

NF-SCHALTER
LF-SWITCH

FM-NF-ADDITION
FM-LF-ADDITION

FREQUENZBEREICH-ENDE
FREQUENCY-RANGE-END

FREQUENZBEREICH-ANFANG
FREQUENCY-RANGE-BEGIN

ENDSTUFE
OUTPUT AMPLIFIER

SCHALTER WOBB./AM
SWITCH SWEEP/AM

BEREICH 3
RANGE 3

BEREICH 7
RANGE 7

BEREICH 10
RANGE 10

KODIERPLATTE B 40403-830.00 CODE-CIRCUIT-BOARD 40403-830.00

FREQUENZBEREICH (ENDE) FREQUENCY RANGE (END)

R 8,2 - 47 K Ω

KODIERPLATTE A 40403-820.00 CODE-CIRCUIT-BOARD 40403-820.00

FREQUENZBEREICH (ANFANG) FREQUENCY-RANGE (BEGIN)

R = 8,2 Ω - 7,5 kΩ 18K 5)

TRANSISTOREN BC238 BY 9654-484.97

LEITERPLATTE HWZ 03
CIRCUIT-BOARD HWZ03
40404-710.00

LEITERPLATTE HWP 02
CIRCUIT-BOARD HWP 02

5) AB GERÄT-NR. 1551

5)FOR SETS FROM SERIAL-No 1551

TRANSISTOR-ANSCHLÜSSE
TRANSISTOR-CONNECTIONS

ALLE TRANSISTOREN
ALL TRANSISTORS

MSW 0207 1%
MSW 0207 2%
MSW 0207 0,25%
SZB 0207

ELEKTROLYT
ELECTROLYTIC
KERAMIK
CERAMIC
MKS

ANDERUNGEN VORBEHALTEN!
ALTERATIONS RESERVED

AB GERÄT-NR.:
FOR SETS FROM SERIAL-NO.:
1201-

GRUNDIG

01 Änderung B AP 09/771166 25.10.77 Bz-ef

1977 Tag Name Gepr. Nr. 40404-906.02

Bl. 4

Zeichnung: Schaltplan
Frequenzbereichsplatte
ab Gerät 1201

Blätter: 5

Archivkopie Copy-No.

Bearb.: AS 5 Appr. KIX

NF-ABGLEICH
LF-CAL

NF-SCHALTER
LF-SWITCH

FM-NF-ADDITION
FM-LF-ADDITION

FREQUENZBEREICH-ENDE
FREQUENCY-RANGE-END

FREQUENZBEREICH-ANFANG
FREQUENCY-RANGE-BEGIN

ENDSTUFE
OUTPUT AMPLIFIER

T30/T40
3V 9654-464.97

SCHALTER WOBB./AM
SWITCH SWEEP/AM

BEREICH 3
RANGE 3

BEREICH 6
RANGE 6

BEREICH 7
RANGE 7

BEREICH 8
RANGE 8

BEREICH 10
RANGE 10

KODIERPLATTE B 40403-830.00 CODE-CIRCUIT-BOARD 40403-830.00
FREQUENZBEREICH (ENDE) FREQUENCY RANGE (END)
R 8,2 - 47 KΩ

KODIERPLATTE A 40403-820.00 CODE-CIRCUIT-BOARD 40403-820.00
FREQUENZBEREICH (ANFANG) FREQUENCY-RANGE (BEGIN)
R = 8,2Ω - 7,5K (18K5)

TRANSISTOREN BF 238
BF 9654-464.97

LEITERPLATTE HWP 02
CIRCUIT-BOARD HWP 02

LEITERPLATTE HWZ 03
CIRCUIT-BOARD HWZ03
40404-710.00

1) ENTFÄLLT WENN BEREICH 6 NICHT GEWOBBELT
2) ENTFÄLLT WENN BEREICH 6 GEWOBBELT
3) ENTFÄLLT WENN BEREICH 8 NICHT GEWOBBELT
4) ENTFÄLLT WENN BEREICH 8 GEWOBBELT
5) AB GERÄT-NR. 1551
1) OMITTED IF RANGE 6 NOT SWEEPED
2) OMITTED IF RANGE 6 SWEEPED
3) OMITTED IF RANGE 8 NOT SWEEPED
4) OMITTED IF RANGE 8 SWEEPED
5) FOR SETS FROM SERIAL-NO 1551

TRANSISTOR-ANSCHLÜSSE
TRANSISTOR-CONNECTIONS
ALLE TRANSISTOREN
ALL TRANSISTORS

MSW 0207 1%
MSW 0207 2%
MSW 0207 0,25%
SZB 0207
ELEKTROLYT
ELECTROLYTIC
KERAMIK
CERAMIC
MKS

ÄNDERUNGEN VORBEHALTEN!
ALTERATIONS RESERVED

AB GERÄT-NR.:
FOR SETS FROM SERIAL-NO.:
1201-

GRUNDIG - Prüfungsamt: Inspect. Dep.
Fertig-Teile-argn.
Oberfläche
Serlaco
Werkstoff / Material:
Maßst. Scale
Polierstufe
Zeichnung
Schaltplan
Frequenzbereichsplatte ab Gerät 1201 Option
Gepr. ASS
Änd. KTK
Änderung - Modification
Tag
Name
Ersatz für
Ers. für
Blatt-Nr. 40404-906 03 BT5
Blätter: 5

FRONTPLATTE
FRONT PANEL

40403-032 00

HF-AUSGANG
HF-OUTPUT
EMK ≙ 380mV
Ri = 75 Ω

BU6

P20
0-100dB

BU 770.03

VORTEILER
PRESCALER

BU 770.05 AN BU780.02

VHF (HF-EINGANG)
VHF (HF-INPUT)

BU 770.02 AN BU 800.02

U_{eff} ≙ 300mV

U_{eff} = 270mV

U_{eff} ≙ 200mV/ 0dB

AUSTASTUNG
KEYING OFF

+1,55V

+2,3V

+1,55V

0/3/6dB ABSCHWÄCHER
ATTENUATOR

0dB - 0,9V
3dB - 2,1V
6dB - 2,4V

0dB - 1,6V
3dB - 1,3V
6dB - 1,1V

0dB-15V
3dB-0,5V
6dB-15V

0dB-15V
3dB-15V
6dB+0,3V

0dB-15V
3dB-15V
6dB+5V

0dB-15V
3dB+12V
6dB-15V

0dB+15V
3dB-2,7V
6dB-3V

ST770.01 AN
BU700.08

A3
A2
A1
6dB
3dB
0dB
-15V

ISTWERT≙120MHz
ACTUAL VALUE≙120MHz

STELLGRÖSSE MOD.
MANIPULATED VARIABLE MOD.

NF

+15V

ISTWERT. MOD.
ACTUAL VALUE MOD

-1,8V

TRENNSTUFE
FREQUENZMESSER
BUFFER STAGE FREQUENCY-METER

DIFFERENZVERSTÄRKER
DIFFERENTIAL-AMPLIFIER

MODULATOR

TRENNSTUFE
BUFFER STAGE

HOCHPASS
HIGH-PASS FILTER

AUSGANGSVERSTÄRKER
OUTPUT-AMPLIFIER

-5,6V

-1,55V

-0,25V

-6,4V

AM -5,6V
FM -5,7V

-50V

-0,16V

AM -0,04V
FM -0,08V

AM -5,1V
FM -5,2V

U_{eff} = 50mV/1KHz
FÜR 80% AM

MODULATOR-AMPLITUDE STELLGLIED
MODULATOR-AMPLITUDE REGULATING ELEMENT

OSZILLATOR-AMPLITUDE ISTWERT
OSCILLATOR-AMPLITUDE ACTUAL VALUE

MODULATOR-AMPLITUDE ISTWERT
MODULATOR-AMPLITUDE ACTUAL VALUE

SPANNUNGEN GEMESSEN BEI 5 MHz
VOLTAGE MEASURED AT 5 MHz

TRANSISTOR-ANSCHLÜSSE
TRANSISTOR-CONNECTIONS

TP 312: T61, T62, T80, T82.

BFX89: T50, T81

BC 237B: T60, T64

DÄMPFUNGSPERLE
VALVO 4 312 020-31 060
*) SIEMENS B 62110-A 3048-X017

ÄNDERUNGEN VORBEHALTEN!
ALTERATIONS RESERVED!

MKH
KERAMIK
CERAMIC
ELEKTROLYT
ELECTROLYTIC
TANTAL-ELEKTROLYT
TANTAL-ELECTROLYTIC

SZB 0207
SZB 0207; 2%
MSW 0309 2%
MSW 0207; 2%

HWM 02
LEITERPLATTE 40404-770.00
PRINTED CIRCUIT BOARD 40404-770.00
BAUSTEIN 40404-004.00
CHIP 40404-004.00

GRUNDIG - Prüfungspunkt:
Inspect. Itm:
Fertg.-Techn. angen.
Oberfläche
Surface
Werkstoff: / Material:
Maßst.: Scale:
Maßmaße: Fit:

Änderung - Modification

Nicht tolerierte Maße nach Abmaßtabelle 9665-100

1977 Tag Name

Ersatz für:

Sach-Nr. 40404-906.08

Teilebez.
Schaltplan HWM 02
Modulator

Gerät: AS 5 Abt. KIX KT 61310

GRUNDIG

MC-Service

ANZEIGEN
INDICATIONS
40 403 – 740.00

LED 1 HA 2134r
LED 2 HA 2134r
LED 3 HA 2134r

ENTFÄLLT AB GERÄT-NR. 1551

TYPE DER IC .1 = F9368 DC
2 = SN7473 N
3 = SN7400 N
4 = SN7451 N
5 = SN7490 N
6 = F9368 DC
7 = SN7490 N
8 = SN7432 N
9 = SN7473 N
10 = SN 7490 N
11 = F 9368 DC
12 = SN7490 N
13 = SN7404 N
14 = SN7408 N
15 = SN7410 N
16 = F9368 DC
17 = SN7490 N
18 = SN7426 N
19 = SN 7400 N
20 = SN 7490 N
21 = F9368 DC
22 = SN7490 N
23 = SN7420 N
24 = SN7493 N
25 = SN7473 N
26 = SN7493 N
27 = SN7493 N
28 = SN7400 N
29 = SN7490 N
30 = SN74221 N
31 = SN74132 N
32 = SN7410 N
33 = SN7421 N
34 = SN7473 N
35 = SN7402 N
36 = SN7400 N
36A = SN74LS107 N
37 = SN7410 N
38 = SN7404 N
39 = SN7451 N
40 = SN7414 N
41 = SN7408 N

* AB GERÄTE-NR. 1551
LD 464/ 465 WIRD GEÄNDERT IN 5× LD 30

SZB 0207
KERAMIK
CERAMIC
FKS
ELEKTROLYT
ELECTROLYTIC
TANTAL-ELEKTROLYT
TANTAL-ELECTROLYTIC

TRANSISTOR-ANSCHLÜSSE
TRANSISTOR-CONNECTIONS
BC 237 B, BC 548 B
BC 307 B, BC 558 B

ÄNDERUNGEN VORBEHALTEN !
ALTERATION RESERVED !

1 GEMEINSAME KATHODE
COMMON CATHODE

6× ST. 740.01
BU. 710.01

MESSBEREICHS-ÜBERWACHUNG
RANGE-CONTROL

UMSCHALTBARER-TEILER
SWITCHABLE DIVIDER
100 KHz — 1 MHz → 1 : 1
1 MHz — 10 MHz → 1 : 10
10 MHz — 100 MHz → 1 : 100
100 MHz — 230 MHz → 1 : 1000
230 MHz — 860 MHz → 1 : 100

ZÄHLERTOR
COUNTER GATE

ZÄHLER-SPEICHERKETTE
COUNTER STORAGE CHAIN

QUARZOSZILLATOR 8,892 MHz
CRYSTAL-OSCILLATOR 8,892 MHz
GERÄTE-NR. 1001...1300, GERÄTE-NR 1301... SIEHE BLATT 2
SERIAL-NUMBER 1001...1300; SERIAL-NUMBER 1301... LOOK FOR PAGE 2

ZEITBASISTEILER
TIME BASE DIVIDER

SPEICHERÜBERNAHME
STORAGE TAKE OVER

MARKENGEBER
MARKER

TEILERUMSCHALTUNG
DIVIDER SWITCH OVER

KOMMA-UMSCHALTUNG
POINT SWITCH OVER

MESSEINGANG
MEASURING INPUT

UMSCHALTUNG-FREQUENZMESSER
FREQUENCY METER SWITCH OVER
EXTERN ⊓ „1"
INTERN ⊓ „0"

FREQUENZMESSER HWT 01
FREQUENCY METER HWT 01
40 403 – 710.00

HAUPTLEITERPLATTE
MAIN PRINTED BOARD
AS5 40 404 – 700.00 HWP 02
WS5 40 403 700.00 HWP 01

BEREICHSSCHALTER	BETRIEBSART	SCHALTERSTELLUNG/FREQUENZBEREICH 1	2	3	4	5	6	7	8	9	10
AS 5	WOBB./GEN. FM	—	—	0,9 ÷ 0,54	—	—	35 ÷ 23	9,5 ÷ 12,5	30 ÷ 45	—	815 ÷ 865
40 404 – 036.00	GEN. AM	0,1 ÷ 0,21	÷ 0,41	÷ 1,0	÷ 2,1	÷ 4,6	÷ 10	÷ 21	÷ 46	÷ 86	÷ 120
	FREQUENZMESS.	0,05 ÷ 1,99			0,05 ÷ 15			15 ÷ 199			
WS 5	WOBB./GEN.	0,39 ÷ 0,54	2,1 ÷ 4,6	÷ 1,0	÷ 2,1	÷ 4,6	÷ 8,6	÷ 130	÷ 230	÷ 460	÷ 860
40 403 – 036.00	FREQUENZMESS.	0,05 ÷ 1,99	0,05 ÷ 15		15 ÷ 199			15 ÷ 230			

ALLE WERTE MHz

SK = SCHALTKAMMER
SE = CONTACT PLATE

FREQUENZBEREICHSSCHALTER
FREQUENCY RANGE SWITCH
FREQUENZMESSBEREICH
FREQUENCY RANGE
MARKE MARK
WOBB/GENERAT. SWEEP/GER.
GENERAL/FREQUENZMESSER
GER./FREQUENCY-METER

BEDIENTEIL
CONTROL UNIT
AS5 40404-730.00
HWP 02
WS5 40403-730.00
HWP 01

MARKE
AUSTASTSIGNAL MARKENKOMPARATOR VON R9 OUT PUT SIGNAL MARK COMPARATOR FROM R9
FÜHRUNGSGRÖSSE MARKE I/II AN D7 CONTROL INPUT MARK I/II
MARKENSTOP AN D1 MARK STOP TO D1
AUSGANGSSIGNAL RÜCKLAUF VON T4 BLACK OUT SIGNAL FLYBACK FROM T4

ANZEIGEN-MESSBEREICHSÜBERWACHUNG
INDICATORS RANGE CONTROL

SCHALTERSTELLUNG			
BETRIEBSARTENSCHALT.	1	2	4
AS5 40404-037.00	WOBBELN	GENERAL FM	GENERAL AM	FREQUENZMESS.
WS5 40403-037.00	WOBB/MARK I	WOBB/MARK II	GENERATOR	FREQUENZMESS.

PRÜFBUCHSEN
TEST-SOCKETS

BEI WOBBLER AM

MARKENKOMPERATOR AUSGANGSIMPULS MARKE ⊓ „1"
MARK COMPARATOR OUTPUT MARK ⊓ „1"

UMSCHALTUNG FÜHRUNGSGRÖSSE MARKE I/II MARKE 1 ⊓ „0"
SWITCH OVER CON-

TRIGG. INPUT MARK I/II MARK 1 ⊓ „0"

MARKE: I ⊓ „1"
MARKE: II ⊓ „0"

UMSCHALTUNG WOBB. ⊓ „0" GENERATOR ⊓ „1"
SWITCH OVER SWEEP ⊓ „1" GENERATOR ⊓ „0"

UMSCHALTG. ⊓ „1" SWITCH OVER ⊓ „1"

AUSTASTIMP. „RÜCKLAUF" „1" RÜCKLAUF ⊓ „0"
BLANKING PULSE „RETURN" „1" RETURN ⊓ „0"

MARKENSTOP ⊓ „1"
MARK STOP ⊓ „1"

GRUNDIG – Prüfungsamt: Ingenieur Bau

Nr.	Änderung / Modification	Tag	Name
01	Änderung lt. AP 09178/1178	9.11.78	Bergt

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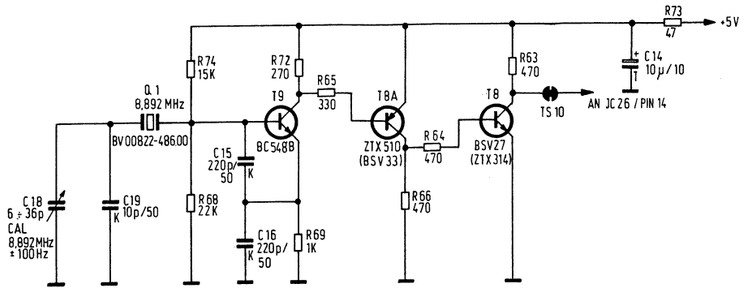
1977 Tag Name
Gez. 6. 8. Ersatz für:
Kontr. Ersatz durch:
Freigabe: 40403-906028.1
Bearb. Blatt/Bl. 2
Schaltplan HWT 01
Frequenzmesser
Benennung Ausführungsart Doppelbl.
Bestell-Nr. AS5/WS5 ser. K IX ref 61310

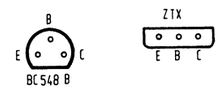
GRUNDIG

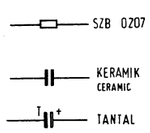


QUARZOSZILLATOR FÜR FREQUENZMESSER AB GERÄTE-NR. 1301...
CRYSTAL-OSCILLATOR FOR FREQUENCY METER FROM SERIAL-NUMBER 1301....

ÄNDERUNG VORBEHALTEN
ALTERATIONS RESERVERD

TRANSISTORANSCHLÜSSE
TRANSISTOR CONNECTIONS





Datum No. of.	Teilbezeichnung - Title		Techn. Periode	Sach Nr. - Ref. No.	
GRUNDIG - Prüfungspunkt: Inspect. Itm.:					
Fertg.-Techn. angen.					
Oberfläche Surface					
Werkstoff: / Material:					
01	Änderung lt. AP 09178/178			13.11.78	Beig
Ind.	Ind. kontrol. ver.	Änderung - Modification		Tag	Name

Nicht laminierte Maße nach Abmaßtabelle 9665-100

Alle Rechte vorbehalten / Rückgabepflichtige Weitergabe, insbesondere Abschrift oder sonstige Mitteilung des geistigen Eigentums wird stets mit strafrechtlichen verfolgt!

1977	Tag	Name	Ersatz für:	Ind.
Gez.	4. 8.		Ersetzt durch:	
Kontr. Gepr.			Zeichn. Nr. 40403-906.02Bl.2 Blätter: 2	Bl. Nr. 01
Norm				

Maßst.: Scale: Positionsdia: FM:

Teilabezeichnung: Schaltplan HWT 01

Title: Quarzoszillator

Arbeitsgruppe Copy-No.

GRUNDIG

Gerät: AS 51 WS 5 | Abt. IX | KT

MARKENSTOP
MARK STOP

SÄGEZAHN/DREIECK-ERZEUGUNG
RAMP/TRIANGLE PRODUCTION GENERATOR

AUSGANGSVERSTÄRKER
OUTPUT AMPLIFIER

SÄGEZAHN/DREIECK-KOMPARATOREN
RAMP/TRIANGLE COMPARATORS

UMPOLSCHALTER
RESERVING-SWITCH

UMSCHALTG. MARKE I/II
SWITCH OVER MARK I/II

FÜHRUNGSGRÖSSE MARKENGEBER
CONTROL INPUT MARKER

ERDFREIE SPANNUNG
FLOATING VOLTAGE

BEDIENTEIL HWB 02
40 404-730.00

FREQUENZBEREICHSÜBERSCHREITUNG
FREQUENCY RANGE OVERFLOW INDICATOR

X-AUSGANG
X-OUTPUT

WOBBELFREQUENZ „CAL"
SWEEP FREQUENCY „CAL"

WOBBELHUB
SWEEP WIDTH

FÜHRUNGSGRÖSSE FREQUENZ
CONTROL INPUT FREQUENCY

MARKENFREQUENZ
MARK FREQUENCY

ZÄHLER:

FREQUENZ FREQUENCY

HAUPTLEITERPLATTE HWP02
40 404-700.00

ZUR LINEARISIERUNG ST 700.12.19 / Bu 720.14.19
TO LINEARIZATION ST 700.19 / Bu 720.14.19

FRONTPLATTE
FRONT PANEL

PRÜFBUCHSE
TEST SOCKET

TRANSISTOR-ANSCHLÜSSE
TRANSISTOR-CONNECTIONS

BFT 10A : T3

BC 237B ; BC 548 B
BC 238 C ; BC 558 B
BC 307 B

MSW 0207
SZB 0207
MKS
KERAMIK
CERAMIC
ELEKTROLYT
ELEKTROLYTIC

ÄNDERUNGEN VORBEHALTEN!
ALTERATIONS RESERVED!

BEREICHSSCHALTER	BETRIEBSART	SCHALTERSTELLUNG/FREQUENZBEREICH											
ASS	GENERATOR AM	1	2	3	4	5	6	7	8	9	10	11	12
40 404-036.00	GEN. FM/WOBB	0,1 ÷ 0,21	0,41 ÷ 1,0	0,9 ÷ 2,1	1,8 ÷ 4,6	4,5 ÷ 10	9 ÷ 21	18 ÷ 46	45 ÷ 100	88 ÷ 210	180 ÷ 460	450 ÷ 1000	MHz
		0,39÷0,54			1,75÷2,75	3,5÷12,5	8,5 ÷ 12,5	13,30÷45		165÷465			MHz
		FM 1)			1) 3)			∿ 3)					

BETRIEBSARTENSCHALTER	SCHALTERSTELLUNG			
ASS 40 404-037.00	1	2	3	4
	WOBBELN	GENERATOR FM	GENERATOR AM	FREQUENZMESSER

SK = SCHALTKAMMER
SK = CONTACT PLATE

1) BIS GERÄTE-ASS F
1) TO SERIAL-ASS F

2) AB GERÄTE-NR 1101 3 OPTION
2) FROM SERIAL-NR. 1101

| | | | | | | | | | | |